

8-25-01

PORTABLE COMPUTER STAND FOR A LAPTOP COMPUTER

1 TECHNICAL FIELD OF THE INVENTION

2 This invention relates generally to computer furniture.
3 More specifically, the invention relates to a portable work
4 surface to support a portable computer while working from home or
5 traveling. This invention provides a surface for a user to
6 conveniently work anywhere, even using a portable computer. The
7 novel features of this invention include its sturdiness, its
8 specific design which increases a user's comfort during operation
9 of a laptop, and its improved design to fold easily to fit within
10 a briefcase.

11
12 BACKGROUND OF THE PRESENT INVENTION

13 The need for a convenient portable stand for laptop owners
14 has long been apparent. As the prevalence of computers has
15 increased, so too has the number of laptop computers being
16 utilized. Computers are generally of the desktop variety,
17 allowing a user to comfortably use the computer while seated at a
18 desk. The portable computer, or laptop, demands a similar
19 comfort for users in an increasing variety of locations.
20 Typically, a computer stand for a laptop provides only a surface
21 for the computer to rest. It has replaced the use of one's lap

1 as the primary surface on which one would rest such a computer.

2 This concept generally has several advantages, such as, keeping
3 the user from possibly burning his legs from the heat generated
4 by the internal components of the computer, and allowing the user
5 more comfortable seating during use.

6 The concept of portable tables and collapsible tables is not
7 a new one. Such tables attempt to provide maximum comfort for
8 users who need a work surface for any reason in a wide variety of
9 locations. These tables are typically used in a location which
10 contains another convenient flat top on which to work.

11 Currently, portable tables are used for many different uses,
12 including eating, working, reading, and writing. With the
13 increasing amount of portable computers, notebook computers,
14 laptops and personal digital assistants (PDA's), such tables are
15 used to support computers, PDA's, books and utensils for work
16 purposes, as well as plates, forks, utensils and food for eating
17 purposes.

18 The increasing number of persons who own laptop computers
19 often prefer to use them while in a seated position, whether
20 sitting in a chair at home, seated vertically in bed, or while
21 seated in transit on a train, plane, or other such transit
22 vehicle. To use a laptop computer in such a fashion typically
23 requires a user to place the computer on his/her lap. This
24 method of use causes the user to sweat, and causes the user
25 muscle fatigue, back aches and neck aches due to the hunched

1 position one must be in to use a laptop in such a fashion.
2 Therefore, laptop users generally prefer some other method of
3 use, such as placing the computer on a portable table, stand or
4 other support means.

5 Also increasing is the number of (PDA) users. PDAs such as
6 the PalmPilot® allow users to do work, write, send and receive
7 email, schedule appointments and accomplish other useful tasks
8 from the palm of their hand. PDA users, like laptop users,
9 prefer to use the PDA while seated, either at home or in transit.
10 Using such a PDA without a portable work surface requires a user
11 to support the PDA in one hand while operating it with the other.
12 Prolonged use of a PDA in this fashion can result in aching
13 muscles and cramped hands. Therefore, PDA users prefer an
14 alternative, such as placing the PDA and any accompanying
15 paperwork on a portable table, stand or other support means.

16 U.S. Patent Numbers 1,719,614, 2,449,492, 2,476,620,
17 3,805,710, 4,119,289, 4,726,556, 5,417,168, and 5,722,624 all
18 disclose collapsable, portable and/or adjustable stands or tables
19 or other support means for supporting items in convenient
20 locations. However, each has various problems and disadvantages.
21 For example, some are uncomfortable or bulky to use, difficult to
22 assemble, require an existing table or desk.

23 For example, U.S. Patent Number 5,722,624, depicted in FIG.
24 1, describes an adjustable surface that clamps onto an existing
25 tabletop. The prior art surface offers a support means for
26 working, which may support a laptop computer. However, use of

1 this type of support depends on an existing tabletop. That is,
2 hooks 2 and arms 4 attach to the underside of an existing desk or
3 table. This requirement limits the use of this type of portable
4 surface. This prior art unit also suffers from two
5 disadvantages. First, the user is required to hunch over to see
6 the laptop screen, and second, that the position of a user's
7 hands is not improved.

8 U.S. Patent Numbers 2,476,620, 3,805,710, 4,726,556, and
9 5,417,168 each disclose portable tables which are folding,
10 collapsible, and self-supporting. One problem with the disclosed
11 prior art is that the unit does not fold efficiently, due to the
12 interference of one leg by the other. The bulky legs render the
13 unit difficult to fold, and therefore, difficult to store. The
14 need exists to provide a portable table which folds easily and
15 efficiently, and therefore fits easily into small spaces.

16 Another disadvantage with prior art portable surfaces is
17 their instability. Such prior art tables include collapsible
18 truss systems and collapsible triangular-shaped legs which are
19 unstable and poorly balanced. U.S. Patent Numbers 3,164,353 and
20 4,726,556 provide examples of tables with such unstable leg
21 systems. These portable tables lack balance and stability as
22 they threaten to collapse and dump their contents which can be
23 costly for laptop users. Therefore, the need exists to provide a
24 portable surface which will remain stable and balanced.

25 Further, adjustable tables are subject to a shifting center
26 of gravity, whereby the unit becomes less stable when the unit is

1 adjusted to different heights. For example, U.S. Patent Numbers
2 2,449,492, 2,476,620, 3,805,710, 4,119,289, 4,726,556 and
3 5,417,168 disclose mechanisms for adjusting height adjustable
4 tables. These mechanisms for adjusting the height of a table are
5 often difficult or awkward to use, or involve moving parts which
6 can be dangerous. In particular, U.S. Patent Number 5,417,168
7 discloses a height adjustment means which uses two slidably
8 engaged pipes with two sets of apertures, where each set of
9 apertures represents a different height and can be selected
10 through the use of an interlocking "catch member." The disclosed
11 height adjustment mechanism suffers from ultra-complexity as well
12 as difficulty. To adjust the height of the disclosed invention,
13 it requires one to align two metal tubes on each of two legs and
14 provide that the "catch member" penetrates both holes.
15 Therefore, the need exists for a portable work surface which can
16 be used easily by people of varying heights.

17 U.S. Patent Number 5,511,758 discloses a portable
18 collapsible desk stand, depicted in FIG. 2, designed for notebook
19 computers to help dissipate the heat from a notebook computer.
20 The stand disclosed includes a tilt for more comfortable use,
21 acknowledging the need for a more comfortable portable laptop
22 stand design. However, it discloses a stand which is overly
23 complex to use (i.e., to open and close). That is, sides 11 and
24 11' are connected to one another with collapsible arm 13, which
25 is secured with pins 14 and 16. This type of stand is unduly
26 complicated and unstable for use during travel, is fixed at a low

1 height (not idea for maximum comfort), and is unstable and
2 difficult to balance. For example, disclosed is a large folding
3 'H' created by sides 11 and 11' and collapsible arm formed by 13
4 and 13', the torque caused by movement on the surface of the
5 table necessarily renders the unit unstable. Further, placing
6 any object or objects other than a uniformly weighted object
7 (such as a laptop computer) on top of the unit may often cause it
8 to tip. Finally, such a unit is not designed for use during
9 travel. The stand depicted in FIG. 2 is only useful when a user
10 needs to work on an existing flat surface. Since the unit
11 disclosed only has legs 11 and 11', the unit does not fit
12 comfortably on a user's lap. Therefore, to maximize stability
13 and efficiency, the unit needs to be supported by an already flat
14 surface such as a table or desk. A further disadvantage is that
15 if either of pins 14 or 16 is accidentally lost, the unit would
16 be rendered unusable. Also, the unit does not elevate the laptop
17 to a comfortable level, causing discomfort to a user's hands
18 while working, and strain on a user's neck caused by constantly
19 looking down at the screen. Therefore, the need exists for a
20 portable, stable unit which can support a laptop, and which can
21 be comfortably used during travel and on any surface, and which
22 can provide a laptop user with comfort to the back, neck and
23 hands.

24 Next, U.S. Patent Number 6,115,249 discloses a typical prior
25 art laptop computer stand, as depicted in FIG. 3, having an
26 enhanced cooling feature, and which is horizontally planar, and

1 compact in nature. This general prior art design suffers from
2 several disadvantages. Shown are base 21 and stand member 23,
3 with upwardly extending feet members 25, 26, 27, 28. First, the
4 horizontally planar nature of the stand forces the typical laptop
5 user to hunch over, straining the back, neck and shoulders. Base
6 21 and stand member 23 do not increase the height of the unit so
7 as to allow the user to alleviate stresses within the neck, back
8 and shoulders. The unit does contain upwardly extending feet
9 members 25, 26, 27, 28 to raise the bottom surface of the base of
10 the computer stand to provide ambient air access. The upwardly
11 extending feet members 25, 26, 27, 28 do not substantially
12 increase the height of the laptop computer. The vertical length
13 of upwardly extending feet members 25, 26, 27, 28 depends on the
14 amount of cooling desired. Further, the horizontal surface
15 forces the user to strain his/her wrists while using the laptop,
16 by not allowing the wrists to arch. The compactness of the unit
17 forces the typical user to hunch over to read the screen as well,
18 as forcing the users wrists to strain while typing. In fact, the
19 only comfort benefit which the stand depicted in FIG. 3 discloses
20 is the removal of unwanted heat. Thus, the prior art laptop
21 stands suffer from several disadvantages and a need exists to
22 develop a portable computer stand which will not force a user to
23 hunch over and strain his/her back, neck, and shoulders.

24 U.S. Patent Number 5,896,817 discloses an entire computer
25 desk having a tilted work surface with an adjustable feature
26 which allows a user to select the degree of tilt (e.g., between

1 30 and 60 degrees). The disadvantage of this design is that it
2 is an entire desk design, which renders it stationary, and thus
3 not applicable to a portable unit.

4 A need for a comfortable alternative to the prior art is
5 widely recognized in the art. Several prior art references
6 attempt to solve this problem. For example, in an attempt to
7 facilitate a laptop-user's comfort, U.S. Patent Numbers
8 5,470,041, 4,648,574 and 3,936,026 disclose a rotatable laptop
9 computer stand support having a swivel base. U.S. Patent Number
10 5,553,824 provides a further attempt at providing comfort by
11 disclosing a laptop computer tray with adjustable length.
12 Finally, United States Patent Number 5,137,236 discloses a swivel
13 tripod support apparatus. None of these prior art patents
14 remedied the problem associated with a laptop user's discomfort.

15 A review of the known prior art shows a need for a laptop
16 stand designed specifically to relieve the stresses and
17 discomfort which accompany laptop usage. The known prior art
18 makes no reference to providing a portable laptop stand for its
19 common seated use, which reduces the muscle strain in a user's
20 head, shoulders, neck and back. Therefore, there exists a need
21 to develop an improved portable laptop stand which relieves the
22 discomfort in the back, neck, shoulders and wrists of a laptop
23 user, which is light-weight and compact for convenient
24 transportation, and which maintains the flexibility to be used in
25 a number of different ways (e.g., on a table, on a lap while
26 sitting, etc.).

SUMMARY OF THE INVENTION

An object of the present invention is to provide an easy to use portable laptop computer stand which alleviates the muscle strains normally associated with laptop usage. More particularly, the invention provides a portable computer stand specifically designed to reduce muscle strain in a user's neck. The present invention also discloses a particular height which allows the typical laptop user to direct his/her eyes more horizontally as well. This unique design also helps keep a user's head level, thereby further relieving neck strain usually associated with laptop use. That is, the stand includes a raised and tilted work surface (preferably 38 degrees) so a user is not forced to crane his/her neck, thereby alleviating the muscle stress associated with laptop usage. The raised and tilted work surface allows a user's eyes to focus more horizontally, keeping the user's head level. By keeping a user's head up, the stress on the user's neck is reduced considerably.

Another object of the invention is to alleviate the back muscle strain usually associated with laptop usage. The tilt of the work surface and the raised height of the laptop screen when extended, approaches eye level. Therefore, to comfortably view the laptop screen, the user's back can remain upright, relieving the stress associated with laptop usage. The height of the

1 surface disclosed within the current invention allows a user to
2 type comfortably without lowering his/her arms to reach the
3 keyboard. By keeping the user's hands and elbows up, the user's
4 back remains straightened throughout use. Therefore, the stand
5 is ergonomically designed to alleviate the back stress normally
6 accompanying prolonged laptop use.

7 Another object of the invention is to relieve the shoulder
8 muscle stresses associated with laptop use. As described above,
9 the raised and tilted work surface keeps a user's head level and
10 back straightened. This positioning aligns the user's head and
11 spine, therefore forcing the shoulders to be positioned over the
12 torso. By keeping the shoulders in line, the current invention
13 reduces or eliminates muscle strain usually accompanying
14 prolonged laptop use.

15 Another object of the current invention is to relieve wrist
16 strain associated with laptop usage. The raised and tilted work
17 surface discussed above allows a user to type more comfortably.
18 The laptop, when placed on the raised and tilted work surface
19 presents a keyboard which is ergonomically pleasant to a user's
20 wrists. It is commonly known that a raised and tilted typing
21 surface is less likely to cause carpal-tunnel syndrome in
22 frequent typists, as the wrist is allowed to arch properly during
23 typing. The current invention's raised and tilted work surface

1 allows the laptop (and therefore the laptop keyboard) which is
2 placed thereon to be raised and tilted, thereby relieving some of
3 the stress placed on a laptop user's wrists. The height of the
4 current invention allows a user's wrists to arch correctly,
5 raising the wrists, elbows and shoulders to a comfortable level.
6 By keeping a user's wrists up, the current invention aligns the
7 user's hand, wrist and arm. This alignment provides a user with
8 maximum comfort and could help prevent the onset of carpal-tunnel
9 syndrome, and could relieve the wrist muscle stresses normally
10 associated with laptop usage.

11 Yet another object of the invention is to provide a sturdy,
12 safe and comfortable working area for use with a laptop computer.
13 One embodiment contains a shelf between the legs of the stand,
14 below the surface. This shelf increases the sturdiness of the
15 invention by providing extra lateral support. The extra support
16 allows the user to enjoy working with a laptop on the invention
17 without worrying about the unit collapsing, dumping its contents,
18 or injuring the user.

19 Still another object of the invention is to provide a
20 portable work surface for use with a laptop computer. One
21 embodiment has hinges which allow the invention to collapse into
22 a substantially flat unit, suitable for carrying in a briefcase,
23 carry-on luggage bag, or the like. Prior art desk stands are

1 bulky and awkward for traveling, while the present invention is
2 small and easily folded to fit in a briefcase or other travel
3 bag. This allows for the convenient use of one's laptop computer
4 while away from home or office.

5 Another object of the current invention is to provide a
6 comfortable office away from the office. Alternative embodiments
7 of the current invention have storage space for pencils, pens,
8 paper, and work. Further, the shelf beneath the computer surface
9 allows the user to keep any necessary materials (i.e. disks,
10 papers, notebooks, etc.) within reach to use when needed.

11 Other objects, features, and characteristics of the present
12 invention, as well as the methods of operation and functions of
13 the related elements of the structure, and the combination of
14 parts and economies of manufacture, will become more apparent
15 upon consideration of the following detailed description with
16 reference to the accompanying drawings, all of which form a part
17 of this specification.

18 19 BRIEF DESCRIPTION OF THE DRAWINGS

20 A further understanding of the present invention can be
21 obtained by reference to a preferred embodiment set forth in the
22 illustrations of the accompanying drawings. Although the
23 illustrated embodiment is merely exemplary of systems for

1 carrying out the present invention, both the organization and
2 method of operation of the invention, in general, together with
3 further objectives and advantages thereof, may be more easily
4 understood by reference to the drawings and the following
5 description. The drawings are not intended to limit the scope of
6 this invention, which is set forth with particularity in the
7 claims as appended or as subsequently amended, but merely to
8 clarify and exemplify the invention.

9 For a more complete understanding of the present invention,
10 reference is now made to the following drawings in which:

11 FIG. 1 shows a prior art computer stand according to U.S.
12 Patent No. 5,722,624;

13 FIG. 2A shows a perspective view of a prior art collapsible
14 laptop support according to U.S. Patent No. 5,511,758;

15 FIG. 2B shows a side view of the prior art collapsible
16 laptop support according to U.S. Patent No. 5,511,758;

17 FIG. 3 shows a prior art laptop support according to U.S.
18 Patent No. 6,115,249;

19 FIG. 4 is a perspective view of the preferred embodiment of
20 the portable computer stand according to the invention;

21 FIG. 4A shows a side view of the portable computer stand
22 depicted in FIG. 4;

23 FIG. 4B is a front view of the portable computer in a

1 collapsed position;

2 FIG. 4C is a side view of the preferred embodiment of the
3 present invention in a collapsed position;

4 FIG. 5 shows a side view of the preferred embodiment of a
5 hinge assembly, for use in connection with the portable computer
6 stand of the present invention;

7 FIG. 6 shows a top plan view of a "snap-in" fastener of the
8 hinge assembly depicted in FIG. 5;

9 FIG. 7A shows a front view of an alternative embodiment of
10 the portable computer stand according to the present invention;

11 FIG. 7B shows a side view of the portable computer stand
12 shown in FIG. 7A; and

13 FIG. 7C shows a top plan view of the portable computer stand
14 shown in FIG. 7A.

15
16 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

17 As required, a detailed illustrative embodiment of the
18 present invention is disclosed herein. However, techniques,
19 systems and operating structures in accordance with the present
20 invention may be embodied in a wide variety of forms and modes,
21 some of which may be quite different from those in the disclosed
22 embodiment. Consequently, the specific structural and functional
23 details disclosed herein are merely representative, yet in that

1 regard, they are deemed to afford the best embodiment for
2 purposes of disclosure and to provide a basis for the claims
3 herein which define the scope of the present invention. The
4 following presents a detailed description of a preferred
5 embodiment (as well as some alternative embodiments) of the
6 present invention.

7 Referring first to FIG. 4, shown is a perspective view of
8 the preferred embodiment of the present invention. As depicted,
9 back 33 is connected to side panels 35 and 35' via hinges 37.
10 Back 33 is also connected to surface 31 via hinges 37. Surface
11 31 rests on the edges of side panels 35 and 35', thereby allowing
12 surface 31 to remain in a raised and tilted position. Surface 31
13 of the preferred embodiment of the present invention is textured
14 to keep materials from slipping around on surface 31.
15 Preferably, surface 31 is between twelve and seventeen inches
16 wide to accommodate a wide range of work environments. In the
17 preferred embodiment, surface 31 measures approximately twelve
18 inches to accommodate a laptop or notebook computer. In
19 alternative embodiments, surface 31 has a much smaller width to
20 provide a comfortable work area for devices smaller than laptops
21 (e.g., PDA's, etc.) or a surface for paperwork, or surface 31 has
22 a width as large as seventeen inches to accommodate a laptop,
23 mousepad and pencil holding devices built in. Surface 31 is

1 smooth, flat and free from any encumbrances in its preferred
2 embodiment. However, in alternative embodiments, surface 31 may
3 be textured and may include a non-slip surface, or may be form-
4 fitted to hold pencils and other work tools. Surface 31 may also
5 contain work enhancement objects such as a clip for holding
6 documents, a built in reading lamp, a mousepad, etc. Also,
7 surface 31 is preferably between ten and fourteen inches deep.
8 The depth of surface 31 allows a user to maximize comfort as well
9 as work area. In the preferred embodiment, surface 31 is
10 approximately twelve inches in depth (i.e., deep enough to
11 accommodate a laptop or notebook computer). The front of surface
12 31 preferably extends from the top of side panels 35 and 35',
13 located approximately three inches off a user's lap, to the top
14 of side panels 35 and 35' at back 33, approximately between seven
15 and ten inches off the user's lap. Surface 31 is preferably
16 positioned at an angle of between thirty and sixty degrees. In
17 the preferred embodiment, surface 31 extends from the front of
18 the present invention, approximately three inches above a user's
19 lap, to back 33 of the present invention, approximately nine
20 inches above a user's lap, where surface 31 is positioned at an
21 angle of approximately thirty-eight degrees.

22 Changing the dimensions of side panels 35 and 35' will
23 result in altering the height and tilt of surface 31. Side

1 panels 35 and 35' preferably provide approximately two to six
2 inches in height to the present invention to allow the user
3 maximum comfort in working. The user's hands, wrists, neck,
4 shoulders and back are most comfortable working on surface 31
5 located two to six inches above the user's lap. In the preferred
6 embodiment of the invention, side panels 35 and 35' are three
7 inches high, allowing the user to work on a surface three inches
8 above his/her lap, or other flat work surface. This embodiment
9 is especially useful during airline travel, as it allows a user
10 to work on an airplane tray table in a relaxed manner. Raised
11 and tilted surface 31 maintains an adequate distance between the
12 unit and the back of the seat in front of the user, even when the
13 front of that seat is reclined, to allow the user to work
14 comfortably throughout the flight.

15 Further, in an alternative embodiment, side panels 35 and
16 35' are wide enough to allow a user to set side panels 35 and 35'
17 down on his/her lap while utilizing the present invention. For
18 example, side panels 35 and 35' may be two to three inches wide,
19 with twelve to twenty inches between them. In alternative
20 embodiments, side panels 35 and 35' are spaced apart such that
21 the user can comfortably place the invention over his/her lap
22 (i.e., with the lap fully between side panels 55 and 55'). In
23 yet another alternative embodiment, side panels 35 and 35' may

1 have an attachment on the bottom of side panels 35 and 35' which
2 extends between them to comfortably rest on a user's lap.

3 Further depicted in FIG. 4 is lip 39 centered on the front
4 edge of surface 31, midway between side panels 35 and 35', and
5 raised in order to keep items such as laptop computers from
6 slipping off surface 31. In alternative embodiments, lip 39 can
7 be of varying lengths, or extending completely from side panel 35
8 to side panel 35'. In another alternative embodiment, lip 39 can
9 be off center, or several lips can be present. Lip 39, like the
10 rest of the present invention, may be constructed from any hard
11 material such as wood, metal or hard plastics, or may be
12 constructed from softer materials such as sponge, foam or soft
13 plastics. Lip 39 may also be covered by a pillow-like material
14 to enhance the user's comfort in the wrists and help minimize or
15 even prevent carpal-tunnel syndrome. Lip 39 may have a
16 rectangular, semicircular, triangular or other shaped cross-
17 section. Lip 39 may also have a form-fitted base to snugly fit a
18 laptop computer, handheld PC, pens, paper or PDA. In yet another
19 alternative embodiment, lip 39 may be attached anywhere on
20 surface 31 to allow for useful attachments. For example, lip 39
21 may be attached two inches from the end of surface 31, and a
22 pencil case may be placed within the remaining two inches. Lip
23 39 need not be linear, nor must it be attached in a manner

1 parallel to any edge of surface 31. An especially preferred
2 embodiment of lip 39 is small and narrow, as well as centered on
3 surface 31 to allow access to a laptop's CD-ROM and disk drives.
4 Different examples of lips are those specially designed to grip
5 laptops, notebook computers, paperwork, PDAs and lips that
6 contain cupholders and other accessories.

7 Still referring to FIG. 4, hinges 37 are used to connect the
8 separate parts of the present invention. With respect to each
9 connection, hinges 37 are located along a parallel axis to afford
10 stability and uniformity. A plurality of hinges is used to
11 increase stability and durability, most preferably an odd number
12 of hinges. In the most preferred embodiment shown in FIG. 4, one
13 of hinges 37 is located midway along the unit's axis (i.e.,
14 midway between side panels 35 and 35'), and two are located along
15 the axis, equidistant from the midway point of the axis. The
16 symmetry around the midway point also increases stability and
17 durability, as well as simplicity during storage of the folded
18 unit.

19 Referring next to FIG. 4A, shown is a side view of a
20 preferred embodiment the present invention. In this embodiment,
21 surface 31 is connected to back 33 with hinges, surface 31 rests
22 on side panel 35, and back 33 is connected to side panel 35 at
23 hinges 37. This preferred embodiment is collapsible into a very

1 thin apparatus by raising surface 31, then folding side panel 35
2 inward, (another side panel located on the opposite side folds
3 inward as well) and then lowering surface 31 over back 33 and
4 side panels 35.

5 Still referring to FIG. 4A, hinges 37 allow side panel 35 to
6 fold flat on top of back 33. In this preferred embodiment,
7 hinges 37 are arranged in such a way that the collapsed stand has
8 a depth of one half inch. In alternative embodiments, hinges 37
9 may be arranged such that the collapsed stand has a depth of less
10 than one inch, to facilitate storage in a briefcase, airplane
11 carry-on bag, or like toting device.

12 In the preferred embodiment depicted in FIG. 4A, surface 31
13 is positioned at an angle α with the horizontal plane, and has
14 flap 32 which extends vertically downward from surface 31, and
15 fits snugly over top front of side panel 35 to prevent wobbling
16 of surface 31 and to lock it in place. Flap 32 is a U-shaped
17 appendage attached to both sides of the bottom of surface 31, the
18 purpose of which is to lock surface 31 to side panel 35. Flap 32
19 may limit the range of motion of side panel 35, allowing it to
20 extend to a maximum position perpendicular to back 33. Flap 32
21 may include a notch or other means for securing side panel 35 in
22 position perpendicular to back 33. In alternative embodiments,
23 flap 32 attaches to said side panel using a temporary attaching

1 means such as velcro or magnets, providing the stand with greater
2 stability and support. Therefore, side panels 35 will always be
3 in the proper position to offer ultimate comfort, and proper
4 support.

5 In alternative embodiments, side panel 35 can be replaced
6 with several other side panel units, with varying shapes, in
7 order to vary angle α and the height of surface 31. Preferably,
8 angle α is within the range of thirty to forty-five degrees. In
9 a most preferred embodiment, angle α is thirty-eight degrees.

10 Referring next to FIG. 4B, shown is a front view of the
11 preferred embodiment of the present invention in a collapsed
12 position. As depicted, side panels 35 and 35' fold along hinges
13 37 to a position approximately parallel to back 33. Surface 31
14 folds along hinges 37 to a position approximately parallel to
15 back 33. When collapsed, the unit comprises four panels
16 approximately parallel to one another, in a substantially stacked
17 position. In the preferred embodiment, all four panels fold so
18 as to be exactly parallel with one another, creating a thin stack
19 for simple storage and carrying. Therefore, the preferred
20 embodiment, in a collapsed state, is only as thick as the depth
21 of the panels, as depicted in FIG. 4C. In alternative
22 embodiments, the unit further comprises a handle for easy

1 transportation, and a locking mechanism to keep all four panels
2 stationary throughout transit.

3 Referring now to FIG. 5, shown is a side view of a hinge
4 assembly according to the preferred embodiment of the present
5 invention. Depicted is hinge 41 attaching back 43 and side panel
6 45. In this embodiment, side panel 45 is attached to the wedge
7 and back 43 contains the holders depicted in FIG. 6. Further,
8 the connection comprises hook 44 to allow the unit to appear
9 seamless, as the end of side panel 45 can be positioned flush to
10 back 43, and at a right angle thereto. Hook 44 is a right angle,
11 but in alternative embodiments, hook 44 can be of varying angles
12 and lengths, or nonexistent.

13 Referring next to FIG. 6, shown is a top plan view of a
14 "snap-in" fastener of the hinge assembly depicted in FIG. 5. As
15 shown, hinge 41 comprises an interlocking device created by wedge
16 47 interlocking with holders 48 and 48'. In a most preferred
17 embodiment, wedge 47 is constructed such that it has tips 49 and
18 49' wherein said tips comprise a locking means to interlock with
19 holders 48 and 48'. Hinge 41 is then constructed by forcing tips
20 49 and 49' toward one another and squeezing tips 49 and 49' of
21 wedge 47 between holders 48 and 48', which are separated by a
22 distance approximately equal to the distance between tips 49 and
23 49'. The locking device of tips 49 and 49' are then integrated

1 with holders 48 and 48' to form the interlocking device. In the
2 preferred embodiment, holders 48 and 48' are located on parts of
3 the present invention. In other words, hinge 41 is constructed
4 by connecting the panels of the current invention, with wedge 47
5 attached to one panel (i.e. the surface) and holders 48 and 48'
6 integrated as part of another panel (i.e., the back). Thus, the
7 unit of the preferred embodiment is connected by a plurality of
8 hinges similar to hinge 41.

9 In a most preferred embodiment, wedge 47 is constructed in a
10 "W" shape, with points on tips 49 and 49' to lock wedge 47 within
11 holders 48 and 48'. In this manner, hinge 41 allows for a
12 virtually seamless connection between panels in the preferred
13 embodiment of the present invention.

14 Referring next to FIG. 7A, shown is a front view of one
15 embodiment of portable computer stand 50 according to the present
16 invention. As shown, portable stand 50 comprises surface 51
17 having lip 57, legs 53 and shelf 55. Surface 51 is attached to
18 legs 53 through any attachment means commonly known in the art
19 with shelf 55 positioned between legs 53 below surface 51. Legs
20 53 preferably provide approximately two to six inches in height
21 to stand 50 to allow the user maximum comfort in working. The
22 user's hands, wrists, neck, shoulders and back are most
23 comfortable working on surface 51 located two to six inches above

1 the user's lap. In the preferred embodiment of the invention,
2 legs 53 are three inches high, allowing the user to work on a
3 surface three inches above his/her lap, or other flat work
4 surface. This embodiment is especially useful during airline
5 travel, as it allows a user to work on an airplane tray table in
6 a relaxed manner. Raised and tilted surface 51 maintains an
7 adequate distance between the unit and the back of the seat in
8 front of the user, even when the front of that seat is reclined,
9 to allow the user to work comfortably throughout the flight.

10 Further, one alternative embodiment of the present invention
11 comprises legs 53 which are wide enough to allow a user to set
12 legs 53 down on his/her lap while utilizing stand 50. For
13 example, legs 53 may be two to three inches wide, with twelve to
14 twenty inches between them. In alternative embodiments, legs 53
15 are spaced apart such that the user can comfortably place the
16 invention over his/her lap (i.e., with the lap fully between legs
17 3). In yet another alternative embodiment, legs 53 may have an
18 attachment on the bottom of legs 53 which extends between them to
19 comfortably rest on a user's lap. In a preferred embodiment, the
20 present invention is used on an airplane during travel. Raised
21 and tilted work surface 51 maintains a comfortable distance
22 between the user and the rear of the seat in front of the user,
23 even when the seat in front of the user is reclined.

1 In the embodiment depicted by FIG. 7A, surface 51 is smooth,
2 flat and free from any encumbrances. However, surface 51 may be
3 textured and may include a non-slip surface, or may be form-
4 fitted to hold pencils and other work tools. Surface 51 may also
5 contain work enhancement objects such as a clip for holding
6 documents, a built in reading lamp, a mousepad, etc.

7 Also shown in FIG. 7A is lip 57 along the front edge of
8 surface 51, which provides support to keep articles on surface 51
9 (i.e., to prevent those articles from shifting, sliding or
10 falling off surface 51). Lip 57, like the rest of stand 50, may
11 be constructed from any hard material such as wood, metal or hard
12 plastics, or may be constructed from softer materials such as
13 sponge, foam or soft plastics. Lip 57 may also be covered by a
14 pillow-like material to enhance the user's comfort in the wrists
15 and help minimize or even prevent carpal-tunnel syndrome.
16 Preferably, surface 51 is between twelve and seventeen inches
17 wide to accommodate a wide range of work environments. In the
18 preferred embodiment, surface 51 measures approximately twelve
19 inches to accommodate a laptop or notebook computer. In
20 alternative embodiments, surface 51 has a much smaller width to
21 provide a comfortable work area for devices smaller than laptops
22 (e.g., PDA's, etc.) or a surface for paperwork, or surface 51 has

1 a width as large as seventeen inches to accommodate a laptop,
2 mousepad and pencil holding devices built in.

3 Also, surface 51 is preferably between ten and fourteen
4 inches deep. The depth of surface 51 allows a user to maximize
5 comfort as well as work area. In the preferred embodiment,
6 surface 51 is approximately twelve inches in depth (i.e., deep
7 enough to accommodate a laptop or notebook computer). The front
8 of surface 51 preferably extends from the top of legs 53, located
9 approximately three inches off a user's lap, to the top of legs
10 53 at back of the unit, approximately between seven and ten
11 inches off the user's lap. Surface 51 is preferably positioned
12 at an angle of between thirty and forty-five degrees. In the
13 preferred embodiment, surface 51 extends from the front of the
14 stand 50, approximately three inches above a user's lap, to the
15 back of stand 50, approximately nine inches above a user's lap,
16 where surface 51 is positioned at an angle of approximately
17 thirty-eight degrees.

18 In one embodiment of the invention, each of legs 53 have
19 notches on their inner sides for attaching shelf 55. Optionally,
20 each of legs 53 has multiple sets of notches to allow for height
21 adjustment of shelf 55. Shelf 55 also provides stand 50 with
22 extra lateral support, enhancing its stability and durability.
23 Alternatively, shelf 55 may be attached to legs 53 using

1 brackets. In yet another alternative embodiment, legs 55 have
2 holes corresponding to different shelf heights, and shelf 55
3 rests on pins placed into these holes. In still another
4 alternative embodiment, shelf 55 is mounted on sliding brackets
5 between legs 53, allowing shelf 55 to slide out towards the user.
6 In another alternative embodiment, one or more drawers, or
7 storage area may be located below surface 51 between legs 53.
8 Shelf 55 may have a flat face, or a form-fitted face with areas
9 for pencils, paper, or other work tools. Shelf 55 may also have
10 a clip or other means to hold work tools in place during
11 adjustment or use of shelf 55. In the preferred embodiment,
12 shelf 55 is rectangular, however, shelf 55 may be circular,
13 triangular, hexagonal, or some other shape.

14 In a preferred embodiment, legs 53 may be connected to
15 surface 51 by hinges. The back of surface 51 is connected to the
16 back of the unit by hinges, and the back of legs 53 are connected
17 to the back of the unit by hinges. Once the user removes shelf
18 55, legs 53 fold along the hinges and the unit collapses into an
19 easily portable unit. When collapsed, this embodiment measures
20 approximately twelve inches in length, twelve inches in width,
21 (i.e., the exact length and width of surface 11) and one and a
22 half inches in depth.

1 Referring next to FIG. 7B, shown is a side view of one
2 embodiment of the present invention. Shown are leg 53 and shelf
3 55. As depicted in FIG. 7B, surface 51 has at its lower (or
4 front) end lip 57 for holding laptop computer 58 in position on
5 surface 51. Lip 57 may have a rectangular, semicircular,
6 triangular or other shaped cross-section. Lip 57 may also have a
7 form-fitted base to snugly fit a laptop computer, handheld PC,
8 pens, paper or PDA. In yet another alternative embodiment, lip
9 57 may be attached anywhere on surface 51 to allow for useful
10 attachments. For example, lip 57 may be attached two inches from
11 the end of surface 51, and a pencil case may be placed within the
12 remaining two inches. Lip 57 need not be linear, nor must it be
13 attached in a manner parallel to any edge of surface 51. An
14 especially preferred embodiment of lip 57 is small and narrow, as
15 well as centered on surface 51 to allow access to a laptop's CD-
16 ROM and disk drives. Different examples of lips are those
17 specially designed to grip laptops, notebook computers,
18 paperwork, PDAs and lips that contain cupholders and other
19 accessories.

20 Referring still to FIG. 7B, shown is the position of shelf
21 55, which is fixed in a position below surface 51, and above the
22 bottom of leg 53. In alternative embodiments, a plurality of
23 shelves may be included, adjustable or movable. In yet another

1 alternative embodiment, shelf 55 may be positioned adjacent to
2 the bottom of leg 53, thereby forming a base for stand 50. This
3 base may have a flat, textured or form fitted top side, and a
4 flat, form fitted, textured or padded bottom side. The bottom
5 side of this base can serve as a padded cushion for use on the
6 user's lap. In yet another embodiment, a shelf may be placed
7 between the base and the surface such that the unit contains both
8 a base and a shelf, each containing a top side that may be used
9 as a storage area for papers, books, and other necessary work
10 items. This embodiment provides increasing stability due to the
11 presence of multiple lateral supports.

12 Referring next to FIG. 7C, shown is a top plan view of one
13 embodiment of the portable computer stand 50 of the present
14 invention. In particular, FIG. 7C shows surface 51 with lip 57
15 on its front edge, centered along the edge, and legs 53 extending
16 from the back of surface 51. This design increases comfort for
17 the user, as the long and wide legs distribute the weight of
18 stand 50 and its contents more uniformly on a user's lap.

19
20 While the present invention has been described with
21 reference to one or more preferred embodiments, such embodiments
22 are merely exemplary and are not intended to be limiting or
23 represent an exhaustive enumeration of all aspects of the

1 invention. The scope of the invention, therefore, shall be
2 defined solely by the following claims. Further, it will be
3 apparent to those of skill in the art that numerous changes may
4 be made in such details without departing from the spirit and the
5 principles of the invention. It should be appreciated that the
6 present invention is capable of being embodied in other forms
7 without departing from its essential characteristics.

8